

Approaches for Deriving an OEL for Peracetic Acid and Occupational Risk Management Considerations

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To provide perspective on current and proposed occupational exposure limits (OELs) for peracetic acid (PAA; CAS 79-21-0) we evaluated PAA toxicity with the aim of understanding uncertainties and their implications for the resulting OEL. The database for PAA is limited and no single study is definitive. Two unpublished reports on human exposures to PAA provide some concentration-response data, indicating that a sensitive acute effect of PAA exposure is eye and respiratory tract irritation, but the studies differ quantitatively. These differences are not surprising, in light of the differences in exposures (apparently pure PAA vapor vs. an aerosol of a mixture), the subjective nature of the reporting, and the likely small sample sizes. The studies are also limited by the lack of clear concentration-duration-response data. Nonetheless, the studies provide a reasonable estimate of the threshold for the onset of irritation in humans in the range of 0.53 mg/m³ for up to 3 hours and 1.56 mg/m³ for up to 45 minutes. RD50 (concentration estimated to cause a 50% depression in respiratory rate) data in mice and rats provide additional information on the irritant potency of PAA. The RD50 in mice was 17 mg/m³ for pure PAA vapor and 12 mg/m³ for a commercial mixture. The rat RD50 was 21.5 to 24.1 mg/m³. Based on the array of human data and the RD50 values in rodents, we calculated potential TWA OELs ranging from 0.26 to 1.56 mg/m³. A similar range of 0.62 - 2 mg/m³ is found among the published OELs, and any of these values could be justified as protective of worker health given the uncertainties in the data and the precision of the OEL methodology. More definitive sensory irritation studies would further clarify selection of a value in this range. Given the extant data, the ultimate OEL choice within a range of reasonable values is a policy-based risk management decision, not a scientific one. The optimal time averaging approach is also not clearly established by the data; however, a combination of a TWA with a STEL is the recommended risk management option.